



July 3, 2008

By Electronic Filing

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band, WT Docket No. 07-195 and Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and the 2175-2180 MHz Bands, WT Docket No. 04-356

Dear Ms. Dortch:

Wireless Strategy, LLC provides business and technology consulting services to wireless operators and vendors. We have years of experience in designing, deploying, and operating wireless networks, and have held executive positions with tier-1 wireless operators in the areas of technology research and development.

We have recently supported ICO in filings with the Commission and have evaluated the FNPRM-proposed band plan for the AWS-2 and AWS-3 spectrum.

After thorough review of studies and measurements filed by neighboring licensees, we have developed a revised band plan that resolves the majority of the interference issues, delivers higher spectral efficiency to licensees, and establishes two paired blocks of spectrum that may be auctioned to foster wireless broadband competition.

Under our proposal, the Commission's goals of supporting a free family friendly wireless broadband network would be enhanced through greater capacity and lower cost of ownership relative to the FNPRM approach.

Furthermore, through the availability of two new blocks of paired spectrum, each capable of supporting a new wireless entrant, our proposal should deliver greater auction revenue than the FNPRM proposal.

We respectfully submit this proposal for consideration by the Commission.

A handwritten signature in black ink, appearing to read "Doug A. Hyslop".

Douglas A. Hyslop
Partner
Wireless Strategy, LLC

The logo features the words "wireless strategy" in a bold, sans-serif font. "wireless" is in black and "strategy" is in red. Behind the text is a stylized graphic of a globe or sphere with a grid of latitude and longitude lines. Several segments of the grid are highlighted in red, creating a pattern that suggests connectivity or signal strength.

wireless strategy

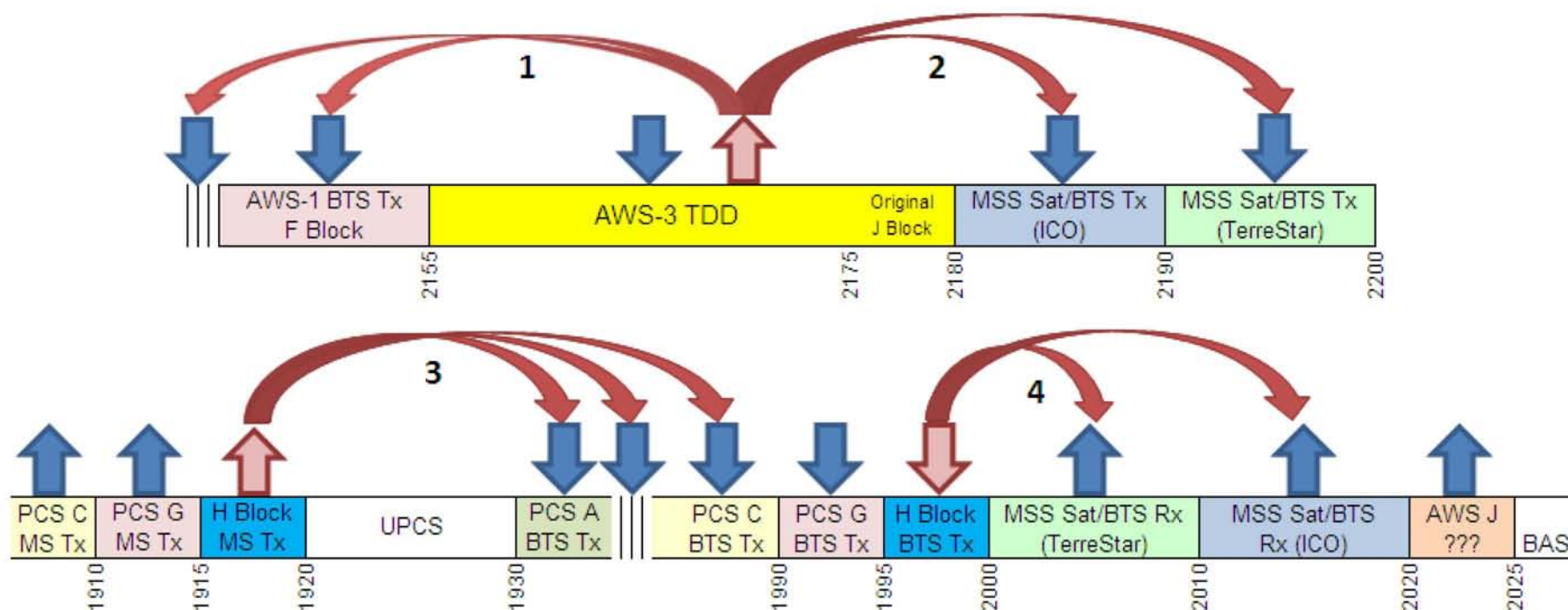
the business of wireless technology

Affordable Family Friendly Broadband
Alternate FDD Proposal

July 3, 2008

FNPRM Band Plan

- The June 20, 2008 FNPRM seeks comment on proposed rules for the AWS-2 and AWS-3 blocks (H Block, J Block, and AWS-3)
- In previous filings, licensees documented the likelihood and extent of interference from the proposal
- Red arrows denote interference from AWS-3 and H Block, totaling four interference boundaries:



Interference Concerns with FNPRM Plan



- AWS-3 TDD interference concerns:
 - AWS-3 device transmit will cause brute force overload and OOB interference to the AWS-1 and MSS/ATC device receivers (boundaries 1 and 2)
 - Stringent filtering, guard bands, EIRP and OOB limits are required to mitigate the interference
 - Such measures reduce spectral efficiency and increase deployment cost for all operators through greater filter insertion loss (AWS-1, AWS-3 and MSS/ATC)
- H Block interference concerns:
 - Intermodulation interference to the PCS B block devices will occur if the entire 1915-1920 MHz block is used for mobile device transmission (boundary 3)
 - In 2005, carriers described intermodulation as the primary interference concern, yet the FNPRM proposes full use of the block
 - H Block device power levels and OOB should be controlled to reduce probability of receiver overload and noise rise (boundary 3)
 - H Block base station transmissions will interfere with MSS satellites and ATC base station receivers in the 2000-2020 MHz blocks (boundary 4)

Family Friendly Broadband is at Risk



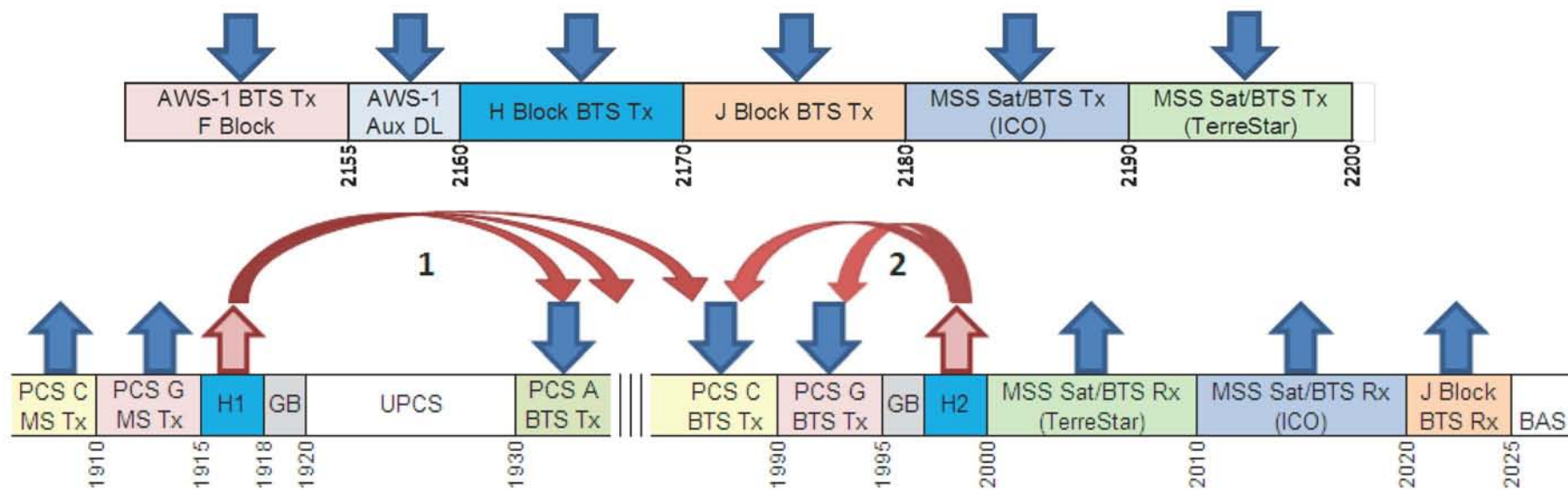
- Global economies of scale will not materialize
 - United States allocation of 2155-2175 MHz for TDD will be the only allocation globally
 - TDD base stations must be specially designed for one operator in one country
 - Devices similarly will be unique for this one customer
 - Lack of scale will drive up cost of devices and network equipment
- Free Family Friendly Wireless Broadband will be Expensive!

Alternate FDD Proposal

- An Alternate FDD band plan will deliver the following benefits:
 - Provide spectrum for two new wireless entrants, one of which may offer free wireless broadband
 - Lower the cost of deploying free family friendly broadband
 - Eliminate AWS-1 and MSS/ATC interference concerns related to the AWS-2 and AWS-3 bands
 - Mitigate interference to PCS mobiles from the H Block
 - Restore harmony with AWS-3 international spectrum allocations

Alternate FDD Proposal

- Pairing the 2155-2180 MHz spectrum with other blocks eliminates AWS-3 interference to the neighboring licensees:



- Alternate FDD plan produces paired spectrum:
 - J Block is expanded to 10 MHz downlink and paired with the existing 5 MHz uplink (2020-2025 MHz)
 - H Block downlink is moved to 2160-2170 MHz and paired with two 3 MHz blocks (H1: 1915-1918 MHz and H2: 1997-2000 MHz)
 - 2155-2160 MHz becomes unpaired auxiliary downlink
 - Appropriate measures may be applied to H1 and H2 to avoid interference to PCS mobiles
- Interference is reduced from four boundaries to two, with guard band to protect PCS

Greater Capacity

- Of the 40 MHz, the FNPRM proposal delivers no more than 25 MHz of usable capacity
 - AWS-3 size increases to 25 MHz for TDD
 - With an implied guard band requirement of 5 MHz per edge, this negates a minimum of 10 MHz
 - Yields 15 MHz of usable capacity
 - H Block 5+5 MHz provides 10 MHz, realistically less depending on interference protection measures
 - J Block lower half is stranded with no clear use, 5 MHz of unused spectrum
- Alternative FDD increases the usable spectrum to 36 MHz
 - AWS Auxiliary Downlink of 5 MHz
 - New 10+5 MHz J Block is 15 MHz
 - New 10+3+3 MHz H Block provides 16 MHz
 - H1 and H2 guard bands of 2 MHz each are not used, 4 MHz
- The Alternative FDD proposal provides 11 MHz more capacity than the FNPRM approach

Performance Comparison

		FNPRM Approach		Alternate FDD		
Parameter		AWS-3	H Block	New H Block	New J Block	Aux. Downlink
Band		TDD	FDD	FDD	FDD	Unpaired DL
Structure		25	10	20	15	5
Total Spectrum (MHz)		10*	0**	0	0	0
Downlink Analysis	Guard Band (MHz)	15	5	10	10	5
	Usable Spectrum (MHz)	60%	100%	100%	100%	100%
	Time Division Duplexing	bps/Hz	1.4	1.4	1.4	1.4
	Capacity (Mbps)	12.6	7	14	14	7
	Total DL Capacity (Mbps)	19.6		35		
Uplink Analysis	Guard Band (MHz)	10	0	4	0	0
	Usable Spectrum (MHz)	15	5	6	5	0
	Time Division Duplexing	40%	100%	100%	100%	100%
	bps/Hz	0.8	0.8	0.8	0.8	0.8
	Capacity (Mbps)	4.8	4	4.8	4	0
	Total UL Capacity (Mbps)	8.8		8.8		

- Alternate FDD delivers greater capacity than the FNPRM approach
 - Compare new H Block to FNPRM AWS-3 numbers in Blue
 - Greater downlink capacity (14 versus 12.6 Mbps) and equivalent uplink capacity (4.8 Mbps)
- Peak downlink rates in the new H Block will be greater than FNPRM TDD rates
 - New H Block: 10 MHz downlink channel active for 100% of the time
 - FNPRM TDD: 15 MHz downlink active for typically 60% of the time (approx. 9 MHz equivalent)
- Commission should apply the family friendly broadband requirements to the new H Block to deliver similar capacity performance

*Assumes 5 MHz guard band per side to meet the FNPRM OOB and filtering requirements, proceeding comments indicate larger guard bands may be required

**Old H Block calculation is optimistic, guard band may be required to mitigate neighboring licensees' interference concerns

New J Block Technology Approach

- 4G OFDMA technologies are well positioned to support asymmetrical FDD operation
 - Flexible channel bandwidths - for example, 3GPP LTE standard supports 1.4, 3, 5, 10, 15 and 20 MHz channels
 - LTE could be modified to include support for different uplink and downlink channel bandwidths
- New J Block could use a 10 MHz downlink channel and a 5 MHz uplink channel
- Wireless broadband services typically require 3X to 5X more downlink capacity than uplink
 - E-mail, file transfers, video streaming and web browsing are highly asymmetrical, consuming 5X to 10X more downlink capacity
 - Gaming, VoIP, and video telephony are more evenly balanced, as are peer-to-peer communications
- Dedicating more spectrum for downlink than uplink provides balanced capacity for the FDD wireless broadband system

New H Block Technology Approach

- The segregated uplink is an unusual configuration but is conducive to multiple technologies. For example, with an LTE deployment:
 - New H Block could use a 10 MHz downlink LTE channel paired with two 3 MHz uplink channels (additional standards work required)
 - Devices would transmit in either H1 or H2 at a given time
 - The H1 and H2 blocks would behave as Auxiliary Uplink, the mirror image of Auxiliary Downlink
- The Family Friendly Wireless Broadband licensee could reduce device cost by constraining H1 or H2 band support:
 - Free broadband service is capped at 25% of system capacity, so the free devices may be designed to transmit in only the H1 block, using half of the capacity in that block
 - Lower-tier paying devices may be designed to transmit in only the H2 block
 - Higher-tier paying devices may be designed to transmit in either of H1 or H2, maximizing the available capacity within a base station
- The segregated uplink will provide RACH channel congestion protection
 - In a sector with one RF carrier, a large number of free customers may create congestion on the random access channel, preventing paying customers from accessing the system
 - The dual-uplink blocks would enable dual RACH access to the system, preventing RACH overload
- Designating the new H Block for family friendly wireless broadband will foster new broadband competition and minimize its deployment cost through reduced filtering and greater capacity relative to the FNPRM TDD approach

Affordable Family Friendly Broadband



- The New H Block operator may leverage PCS and AWS scale
 - H1 devices may use frequency-shifted PCS transmitters and filters, and AWS international allocation receivers
 - H2 devices may use MSS/ATC frequency-shifted transmitters, and AWS international allocation receivers
 - New H base stations will be harmonized with AWS-1 and may use AWS-1 base station transmitters, power amplifiers, and filters
 - New H base station receivers would be slightly modified PCS and MSS/ATC receivers to cover H1 and H2
- Leveraging PCS/AWS economies of scale will greatly reduce network deployment cost
- Device cost will be significantly lower than a standalone TDD technology, an essential requirement to delivering free family friendly wireless broadband

Summary

- Alternate FDD provides greater spectral efficiency with less interference than the FNPRM proposal
- New H and J blocks may each support a new wireless broadband entrant
 - H is well suited for family friendly wireless broadband
 - J may support a new competitive entrant or provide capacity expansion for a smaller existing company
- The 5 MHz block of auxiliary downlink spectrum will provide additional capacity to foster broadband deployment
- Cost to deploy AWS-1, AWS-3 and MSS ATC systems will be lower
- The US spectrum in 2155-2180 MHz will match International allocations of base station transmit, facilitating economies of scale